ÄKTA*design*

ÄKTApurifier

Installation Guide

18-1140-44

Amersham Biosciences

Important user information

Meaning: Consult the instruction manual to avoid personal injury or damage to the product or other equipment.

WARNING!
The Warning sign is used to call attention to the necessity to follow an instruction in detail to avoid personal injury. Be sure not to proceed until the instructions are clearly understood and all stated conditions are met.

CAUTION!
The Caution sign is used to call attention to instructions or conditions that shall be followed to avoid damage to the product or other equipment. Be sure not to proceed until the instructions are clearly understood and all stated conditions are met.

Note
The Note sign is used to indicate information important for trouble-free or optimal use of the product.

Should you have any comments on this instruction, we will be pleased to receive them at:

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1 About this installation guide

ÄKTA™ purifier is assembled and fully tested before shipping.

For safe transportation, however, some components have been secured and thus need to be detached before the system can be tested and used.

Cables, capillaries, accessories, etc. are enclosed in paper boxes or in Box-900 located at the top of the instrument pile.

This guide describes how to install ÄKTApurifier 10 and ÄKTApurifier 100. The description is common for both systems, unless otherwise is clearly stated in the contents. The differences are few and indicated with divergent type face.

The guide is divided into two parts; one describing the installation and one describing how to run the installation test. After the installation procedure has been performed, your ÄKTApurifier is ready for purification work.

For full details of specifications, methods, maintenance etc., refer to the respective User Manuals and Instructions.

2 Safety

- The system is designed for indoor use only.
- Do not use in a dusty atmosphere or close to spraying water.

Refer to Technical Specifications in the System Manual for detailed environmental pre-requisites.

WARNING! The individual instruments must not be opened by the user. They contain high voltage circuits that can give a lethal electric shock.

WARNING! Monitor UPC-900 uses high intensity ultra-violet light. Do not disconnect the optical unit while the lamp is ON.

WARNING! ÄKTApurifier must be connected to a grounded mains socket.

WARNING! There must always be a sample loop or Superloop™ connected to ports 2 and 6 of the injection valve. This prevents liquid spraying out of the ports when switching the valve, which is especially dangerous if hazardous chemicals are being used.

WARNING! Two people are required to lift the system.

WARNING! Never block the ports on the outlet valve with stop plugs, since this will create over-pressure and may result in injury.

WARNING! Only spare parts approved or supplied by Amersham Biosciences may be used for maintaining and servicing the system.

WARNING! If the system is turned around or the fraction collector removed, the external capillaries and other tubings may become entangled in nearby objects and be pulled from their connections causing leakage.

WARNING! Never place waste containers on the top of the system. If they become full and overflow, liquid may penetrate the system causing a short-circuit.

3 Pre-requisites

WARNING! ÄKTApurifier must be connected to a grounded mains socket.

- Two people are recommended to lift ÄKTApurifier onto the working bench.
- To install ÄKTApurifier, a working area of about 200 x 80 cm is required.
- ÄKTApurifier requires 100-120/220-240 VAC, 50/60 Hz electrical supply with safety grounding.
- Cutting pliers are recommended for cutting plastic straps.
- A waste flask.
- The installation test requires the following solutions:
  - 1000 ml of distilled water for priming and purging the pump.
  - 500 ml of 0.4% acetone in distilled water.
  - 100 ml of 20% ethanol in distilled water.

4 Installation overview

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- Detach secured items, and install items enclosed 6
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- Complete the first two sections of the installation record 20
- Prepare ÄKTApurifier for the installation test 9
- Run the installation test method 12
- Evaluate the gradient 16
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- Evaluate the UV response 16
- Complete the test record 19
- Complete the registration form 21
- Complete the final section of the installation record 20
- Store photocopies of all records and forms in the System Logbook.
- Store the Installation Guide in the User Manual box.

5 Installation of ÄKTApurifier

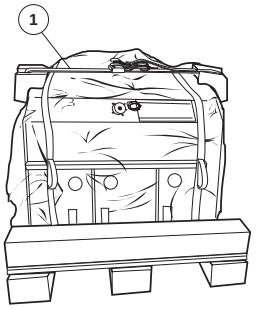
Begin by creating a clean and dry working area of 200 x 80 cm that allows easy access. Then follow the step-by-step instructions below and fill in the installation record as you go along, see page 20.

Note: *Some components are packed in Box-900, located at the top of the system.*

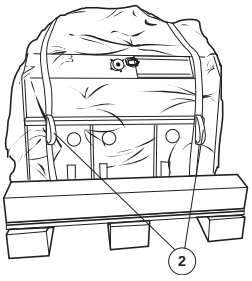
Note: *Some packing lists are included in the paper boxes.*

5.1 Unpacking

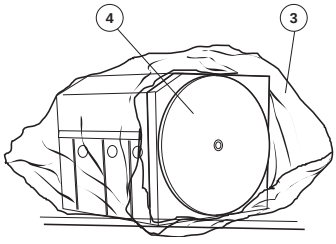
- After having removed the cardboard hood, check the contents against the attached packing list. Check also all included boxes. Store all the enclosed paper boxes and plastic bags in a convenient nearby place.
- Release and remove the red strap (1) holding the system to the pallet.



- Lift ÄKTApurifier onto the work area using the four strap handles (2). Two people are required to lift the system. Don`t raise to upright position yet. Lay the system on the same side as on the pallet.
- Release the two red straps with the strap handles. Allow the straps to remain taped to the plastic cover.

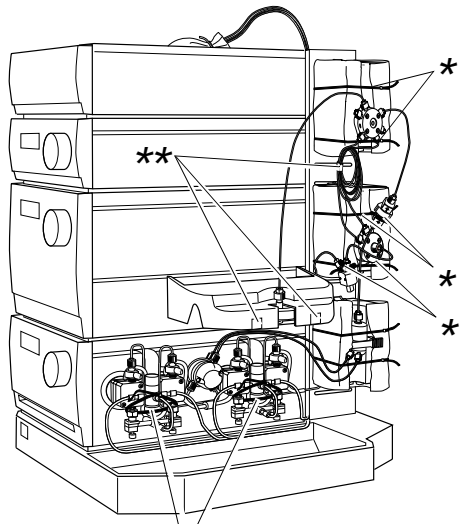


- Pull back the plastic cover (3) to uncover the swivel platform (4) and raise the system to an upright position.
- Remove the plastic cover with the red straps from the system.
- Save all the original packing material. If, for any reason, the equipment has to be repacked, for transportation or otherwise, it is important that the system can be safely packed using the original packing material.



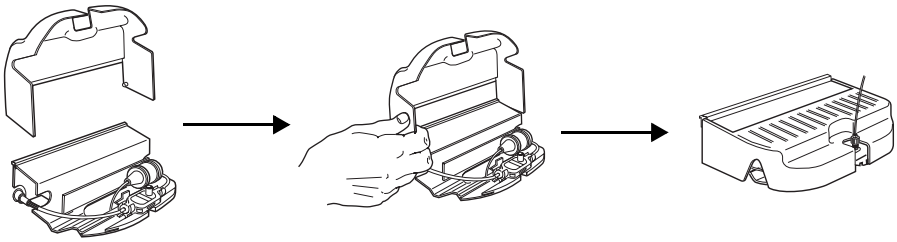
- Turn ÄKTApurifier on its swivel platform to access the fluid component side of the system.
- Detach the following items by cutting straps and removing red tape. Also remove the desiccant bags.:

Note: *Use cutting pliers. Be careful not to cut any capillaries by accident. Make sure not to lose any of the capillary marking tags.*



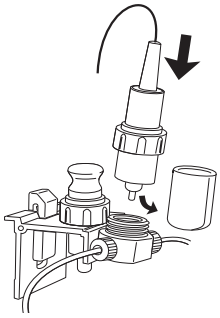
- INV-907, located at the top right side. Detach the valve from the attachment bracket to remove the protective foam, and reposition the valve to the top slot in the attachment bracket.
- PV-908, located below INV-907. Cut also the straps holding the On-line filter and the Flow restrictor. Detach the valve from the attachment bracket to remove the protective foam, and reposition the valve to a slot one position up from its transportation position slot in the attachment bracket.
- M-925, located below PV-908. Detach the mixer from the attachment bracket to remove the protective foam, and reposition the mixer to the same slot in the attachment bracket.
- SV-903A and SV-903B, located between the pump heads on P-900.
- UV cell cover, located above the UV flow cell. Remove the red tapes.
- Capillary loops. Remove the red tape holding the capillary loops attached to INV-907 (waste capillaries W1 and W2) and PV-908 (waste capillary W3).
- Place the waste tubings W1, W2 and W3 in waste bottles and place the bottles in front of ÄKTApurifier, or wherever convenient.
- Unpack the inlet tubing fixed in a plastic bag taped to the buffer tray on top of Box-900.
- Make sure all items are securely fitted, and that no capillary connection has worked loose, or been tangled.
- Attach the column holder enclosed in Box-900 above the UV cell. Select a slot to suite the height of the column to be used.

Should the cover over the UV cell compartment come loose, it is refitted in the following way:



- The cover is a simple push fit onto the cell holder. Two small lugs on the cover locate in holes at the front and rear of the cell holder.
- The cover is then lowered over the cell holder.

The pH flow cell and pH electrode is not mounted from factory in ÄKTApurifier. If you want to include these items, follow the installation procedures described in the System Manual and the Monitor pH/C-900 User Manual. They are both included in the ÄKTApurifier manual box.

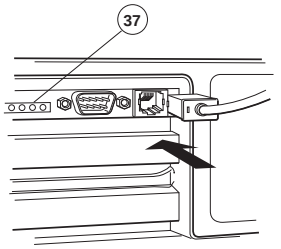


Note: *The installation of a fraction collector (optional) is described in the ÄKTAdesign Optional Configurations User Manual. Refer to the section that describes your model.*

5.2 Installing the computer and the cables

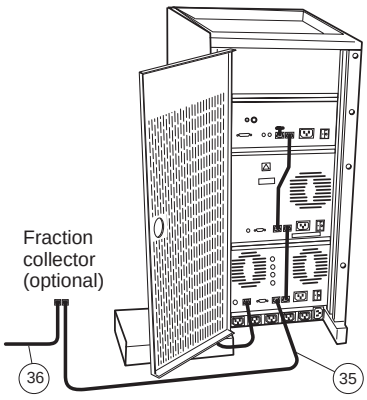
- Unpack and install the computer and printer according to the manufacturer's instructions. Place them to the left of the system. Do not switch them on!

CAUTION! The mains power to ÄKTApurifier must be switched OFF before the UniNet 1 cabling is installed.



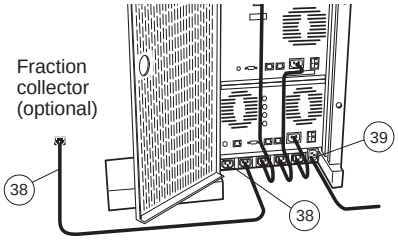
- Complete the UniNet 1 data communication chain by connecting a UniNet 1 cable between the computer and Pump P-900.

CAUTION! The UniNet connection to the computer MUST be made to the board with four LEDs (37).

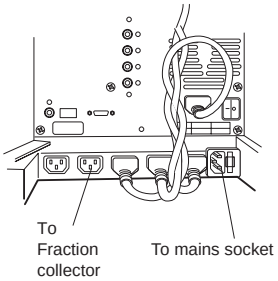


- If using a fraction collector, connect the UniNet 1 cable (35) between Pump P-900 and the fraction collector, and UniNet 1 cable (36) between the fraction collector and the computer.
- All other UniNet 1 cables are connected at delivery.

WARNING! ÄKTApurifier must be connected to a grounded mains socket.



- Connect a mains cable (39) supplied between ÄKTApurifier and a properly grounded mains socket. Do not switch on!
- If using a fraction collector, connect a mains cable supplied (38) between the fraction collector and a mains socket at the rear of ÄKTApurifier.
- Complete the two first sections of the Installation record on page 20.
- The installation phase of ÄKTApurifier is now completed.



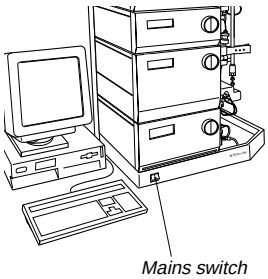
6 Installation test

The installation test checks the function of the solvent delivery and the UV monitoring system of ÄKTApurifier. The installation test can also be used at any time to check the condition of the system, e.g. after a prolonged stop.

Correct gradient formation is tested by producing a linear gradient and a series of concentration steps of acetone.

Correct UV monitoring is tested by monitoring the acetone concentration at 265, 254 and 280 nm and calculating the absorbance ratios 265/254 nm and 265/280 nm.

6.1 Preparation of ÄKTApurifier



Start-up of the ÄKTApurifier separation unit

1 Switch on the separation unit using the mains switch located to the left on the base platform.

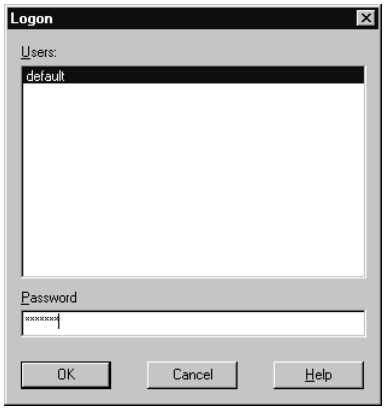
Start-up of the computer and UNICORN software

1 Switch on the computer, the display and the printer according to the instructions in the manufacturer manuals.

2 Log into Windows™ NT by first pressing **Ctrl-Alt-Del**, and then clicking on OK.

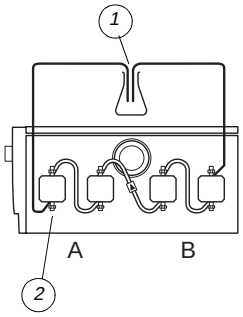
3 When the Windows NT desktop appears, start UNICORN by double-clicking on the UNICORN™ icon.

4 Select user **default** and enter **default** as password. Click on **OK**.



5 Click on the **System Control** button in the task bar.

6.2 Priming and purging Pump P-900



1 Immerse the rinsing tubing in a flask (1) containing 20% ethanol in distilled water.

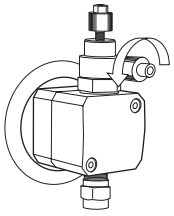
2 Connect a syringe to the rinsing tubing that is connected to the underside (2) of the left pump head on pump A. Slowly draw rinsing solution to the syringe. When rinsing solution starts to enter the syringe, continue to draw a few millilitres.

3 Loosen the syringe and immerse the tubing in the rinsing solution (1).

Purge the Pump P-900 as follows:

1 Immerse the inlet tubing of all pump modules, with filters, distilled water flask.

Note: *Never place the reservoir flask below the level of the pump inlet.*



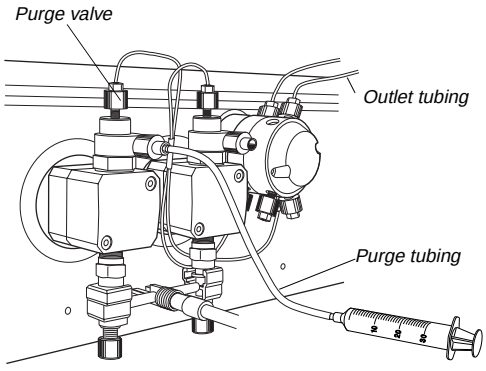
2 Connect a male Luer syringe of about 30 ml to the open end of the purge tubing.

3 Connect a male Luer connector at the other end of the purge tubing to the left purge valve at pump module A.

4 Turn the purge valve counter clockwise half a turn to open it and slowly draw eluent into the syringe.

5 When fluid starts to enter the syringe continue to draw a few millilitres before closing the purge valve. Check that there is no visible air left in the inlet tubing.

6 Repeat steps 3 to 5 for the other pump heads.



Testing pressure stability

Perform a pressure test to establish that all air has disappeared from the pump heads. Perform as follows:

1 Connect a column bypass capillary between the injection valve, port 1, and the top of the UV optical unit.

2 *ÄKTApurifier 10*:
Run 0.2 ml/min at 0%B (distilled water). Check on the pump display that the pressure reading is stable (variation < ±0.02 MPa).

ÄKTApurifier 100:
Run 10 ml/min at 0%B (distilled water). Check on the pump display that the pressure reading is stable (variation < ±0.2 MPa).

3 *ÄKTApurifier 10*:
Run 0.2 ml/min at 100%B (distilled water). Check on the pump display that the pressure reading is stable (variation < ±0.02 MPa).

ÄKTApurifier 100:
Run 10 ml/min at 100%B (distilled water). Check on the pump display that the pressure reading is stable (variation < ±0.2 MPa).

4 Proceed to step 5 if the pressure is stable. If not, consult the Pump P-900 User Manual for trouble-shooting instructions.

5 Click on **END**.

6 Transfer the inlet tubing B1 into a flask containing 500 ml of 0.4% acetone in distilled water.

Installation Test Method Guide	
Buffer A:	Distilled water
Buffer B:	0.4% acetone in distilled water
Test flow rate:	5 ml/min in ÄKTApurifier 10 10 ml/min in ÄKTApurifier 100
Test run time:	Approximately 30 minutes

6.3 Running the installation test method

1 Start UNICORN as described in the "Making your first run" booklet, section *2.2, UNICORN Overview.*

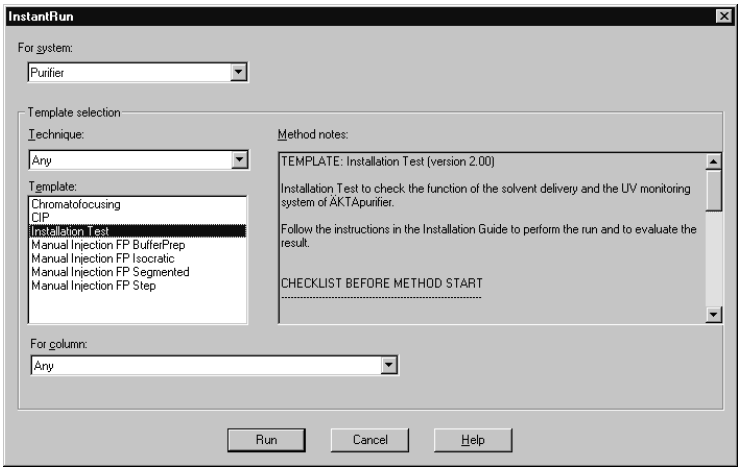
2 The Toolbar guide is displayed after start-up. Click on **Close**.

3 Select **File:Printer setup...** from the main menu bar. Select the appropriate printer from the list and select **Landscape**. Then click on **OK** to acknowledge the printer chosen.

4 Return to the Main menu screen

5 Click on the **Instant Run** button.

6 Select **Installation Test** in the templates list, and make sure that **Any** is selected for both **Technique:** and **For column:**.



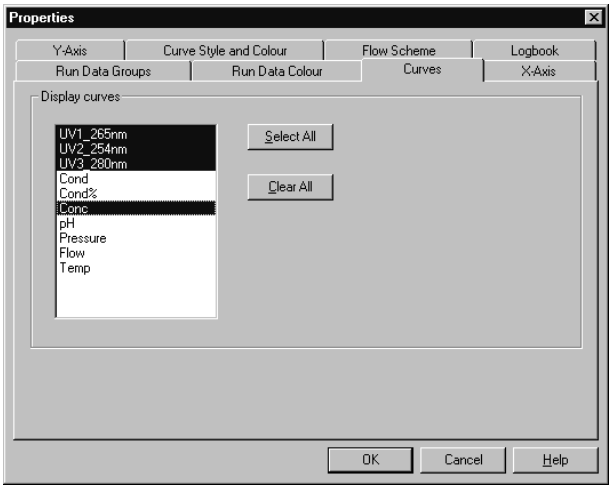
7 Click on **Run**.

8 When the **Method** window is shown, click on **Next** and then **Next** again.

9 Click on **Start** to start the installation test method.

Note: *Irrelevant information may be de-selected by clicking in the* ***Curves*** *window with the right mouse button, and then selecting* ***Properties****.*

10 Click on the **Curves** tab.

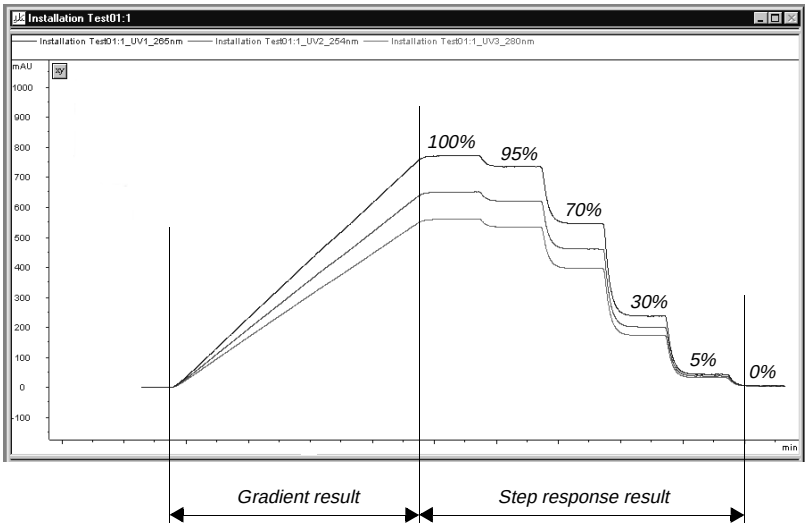


11 Select the following curves to be displayed:

- **UV1_254nm**
- **UV2_265nm**
- **UV3_280nm**
- **Conc.**

De-select all other highlighted curves.

12 The curves may now be monitored on the screen as the test progresses. The installation test method run time is approximately 30 minutes.



13 When the test is finished, the printer automatically prints out the chromatogram and the test result.

6.4 Evaluating the installation test results

Automatic evaluation

The system automatically prints out the test result when the test is finished. The print-out consists of a chromatogram and an evaluation of the test result.

- If the gradient test result is OK, the print-out says "Gradient linearity accepted".
- If the step response test result is OK, the print-out says "Step response accepted".
- If the UV response test result is OK, the print-out says "UV response accepted".

If any of the evaluated values falls outside the specified range, go to section *6.5 Correcting faulty evaluation results*.

Manual evaluation

If your chromatography system differs from the standard configuration, e.g. if optional components have been installed, the automatic evaluation will not give a reliable result. A manual evaluation is required.

1 Minimise the run data window to access the Main menu.

2 Click on in the results window and then double-click on the **Installation Test01** icon to open the result file.

3 Maximise the chromatogram window by clicking on in the upper right corner.

4 Click in the **Curves** window with the right mouse button and select **Properties**.

5 Click on the **Curves** tab and select the following curves to be displayed:

- **Installation Test01:1_UV1_265nm@01,SMTH**
- **Installation Test01:1_UV2_254nm@02,SMTH**
- **Installation Test01:1_UV3_280nm@03,SMTH**
- **Installation Test01:1_Conc**

6 Press **OK**.

7 Double-click on in the upper left corner of the chromatogram window and read the absorbance for the steps corresponding to **Installation Test01:1_UV1_265nm@01,SMTH.** Move the vertical bar to the constant section of each plateau by dragging it. Enter the absorbance values (in mAU) in column 2 in the Step response table of the Test record (see page 19), leaving out the decimals.

8 Read the absorbance for the plateaus corresponding to 0% and 100%B for the curves (click on the curve name to change the curve reading):

- **Installation Test01:1_UV1_265nm@01,SMTH**
- **Installation Test01:1_UV2_254nm@02,SMTH**
- **Installation Test01:1_UV3_280nm@03,SMTH**

and enter the values in column 2 in the UV response table of the Test record (see page 19).

9 Click on **Print** under **File** to print out the chromatogram.

Evaluating the gradient

Place a ruler along the gradient part of curve **Installation Test01:1_UV1_265nm@01,SMTH** in the printed report.

The curve should be linear between 10% B and 90% B and void of discontinuities.

Evaluating the step response

Calculate the relative adsorption plateau heights for curve **Installation Test01:1_UV1_265nm@01,SMTH** as follows:

- Subtract the base line value (0%B) from each of the values in column 2 in the Step response table of the Test record (see page 19) and enter the results in column 3.
- Divide each value in column 3 by the base line corrected value corresponding to 100%B, multiply by 100 and enter the results in column 4.

The values of column 4 should all fall within the intervals given in column 5.

Evaluating the UV response

Calculate the UV response ratios in the following way:

- Subtract the base line values (0% B) corresponding to each UV curve from the values in column 2 of the UV response table of the Test record (see page 19) and enter the results in column 3.
- Calculate the absorbance ratios 265 nm/254 nm and 265 nm/280 nm using the values of column 3 and enter the results in column 4.

The ratios obtained should all fall within the intervals given in column 5.

6.5 Correcting faulty evaluation results

Should any of the evaluated values fall outside the specified range, proceed as follows:

- If the system differs from the standard configuration, evaluate the result manually.

  If the faulty evaluation result remains, continue below.

Faulty gradient

- The gradient is linear but the interval is too small - the mixer chamber is too large, or the mixer is faulty.
- Disturbances - may arise from air in the pump, pump valves or bad sealings in the pump. Refer to the Pump P-900 User Manual.

Faulty step response

- If all values are faulty – air in the pump or a faulty pump.
- 5% and 95% faulty – bad sealing in the pumps (5% faulty = pump module B, 95% faulty = pump module A).

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7 Test record

Date: .....

ÄKTApurifier serial no.: .....

7.1 Gradient test result

Gradient linear from .....%B to.....%B. (10 - 90%)

7.2 Step response test result

Step response table:

1 Programmed Conc.%B	*2 Value read*	*3 Baseline corrected value*	*4 Normalised value*	*5 Allowed interval*
100				
95				94 - 96
70				69 - 71
30				29 - 31
5				4 - 6
0				

7.3 UV response test result

UV response table:

1 Wavelength (nm)	*2 Value read*		*3 Baseline corrected value*	*4 Absorbance ratio*	*5 Allowed interval*
	100% B	*0% B*			
254					
265/254					1.11 - 1.26
265					
265/280					1.26 - 1.53
280					

8 Installation record

Check	Sign	Remarks
1 Unpacking • Contents according to packing lists. • All packing material removed. • No visible damage.		
2 Installation • Injection valve waste tubings (port 4 and 5, marked W1 and W2) to waste reservoir. • Outlet valve waste tubing (port 1, marked W3) extended to waste reservoir. • Column holder installed. • pH electrode holder installed (optional). • Computer and printer installed. • UniNet 1 cabling installed. • Mains power cabling installed.		
3 Installation test • Solutions prepared. • Tubings to piston seal rinsing system in 20% ethanol. • ÄKTApurifier prepared. • Installation Test method run. • Installation Test results evaluated. • Test Record completed. • Registration Form completed. • Test Record and copy of Registration form stored in System Logbook. • Registration form posted to Service Administration. • Installation Guide stored in User Manual box for future use.		

9 Registration form

IMPORTANT
WARRANTY REGISTRATION INFORMATION

Please ensure that this form is completed and returned to Service Administration to register the users' equipment under warranty.

Name: .....

Institute/company: .....

Address: .....

Department/location: .....

Post Code: .....

Phone Number: ..... Fax Number: .....

End Users: ..... E-mail: .....

Date of Installation: ..... QuoteNo: .....

Customer Order No: ..... Invoice No: .....

Support Agreement purchased with the instrument: Y / N

If YES give details: .....

Installer (name): ..... Signature of Installer: .....

Installation Accepted: ..... Date: .....

Note: *Fill in serial numbers over-leaf.*

Components

ÄKTApurifier System serial numbers:.....

QTY	*Part Number*	*Description*	*Serial Number*
		System rack	
		Mixer M-925	
		Monitor UV-900	
		Pump P-900	
		pH/C-900	
		INV-907	
		PV-908	
		SV-903 (A)	
		SV-903 (B)	
		Computer	
		Computer display	